

Claims:

1. A process for synthesis, deprotection, and purification of an RNA molecule comprising:
  - a) synthesis, wherein said synthesis comprises solid phase oligonucleotide synthesis under conditions suitable for isolating a protected or partially protected RNA molecule;
  - b) deprotection, wherein said deprotection comprises a one pot deprotection process comprising:
    - i) contacting said protected or partially protected RNA with a mixture of an alkylamine and a polar organic reagent in predetermined proportions under conditions suitable for the cleavage of said RNA from a solid support and the removal of nucleic acid base and phosphate protecting groups from said RNA, and
    - ii) contacting the RNA with triethylamine-hydrogen fluoride under conditions suitable for the removal of a 2'-OH protecting group; and
  - c) purification under conditions suitable for isolating said RNA molecule.
2. The process of claim 1, wherein said purification comprises HPLC purification.
3. The process of claim 2, wherein said HPLC purification comprises reverse phase chromatography.
4. The process of claim 2, wherein said HPLC purification comprises ion-exchange chromatography.
5. The process of claim 1, wherein said RNA comprises trialkylsilyl protecting groups.
6. The process of claim 5, wherein said trialkylsilyl is *tert*-butyl dimethylsilyl.

7. The process of claim 1, wherein said RNA comprises one or more modified nucleotides.
8. The process of claim 1, wherein said modified nucleotide comprises a 2'-deoxy-2'-fluoro nucleotide.
9. The process of claim 1, wherein said modified nucleotide comprises a 2'-O-methyl nucleotide.
10. The process of claim 7, wherein said modified nucleotide comprises a 2'-deoxy nucleotide.
11. The process of claim 1, wherein said alkylamine comprises methylamine.
12. The process of claim 1, wherein said solid phase synthesis utilizes controlled pore glass.
13. The process of claim 1, wherein said solid phase synthesis utilizes polystyrene.
14. The process of claim 1, wherein said phosphate protecting groups comprise cyanoethyl protecting groups.
15. The process of claim 1, wherein said nucleic acid base protecting groups comprise N-acetyl, N-benzoyl, or N-isobutyryl protecting groups.
16. The process of claim 1, wherein said RNA comprises one or more modified internucleotide linkages.
17. The process of claim 16, wherein said modified internucleotide linkage comprises a phosphorothioate or phosphorodithioate internucleotide linkage.
18. A process for synthesis, deprotection, and purification of an RNA molecule comprising chemically modified nucleotides comprising:
  - a) synthesis, wherein said synthesis comprises solid phase oligonucleotide synthesis under conditions suitable for isolating a protected or partially protected RNA molecule;

b) deprotection, wherein said deprotection comprises a one pot deprotection process comprising:

- i) contacting said protected or partially protected RNA with a mixture of an alkylamine and a polar organic reagent in predetermined proportions under conditions suitable for the cleavage of said RNA from a solid support and the removal of nucleic acid base and phosphate protecting groups from said RNA, and
  - ii) contacting the RNA with triethylamine-hydrogen fluoride under conditions suitable for the removal of a 2'-OH protecting group; and
- c) purification under conditions suitable for isolating said RNA molecule.

19. The process of claim 18, wherein said modified nucleotide comprises a 2'-deoxy-2'-fluoro nucleotide.

20. The process of claim 18, wherein said modified nucleotide comprises a 2'-O-methyl nucleotide.

21. The process of claim 18, wherein said modified nucleotide comprises a 2'-deoxy nucleotide.

22. The process of claim 18, wherein said alkylamine is methylamine.

23. The process of claim 1, wherein said protected or partially protected RNA is contacted with said mixture of alkylamine and polar organic reagent in predetermined proportions at room temperature for about 30 minutes to about 100 minutes.

24. The process of claim 18, wherein said protected or partially protected RNA is contacted with said mixture of alkylamine and polar organic reagent in predetermined proportions at room temperature for about 30 to about 100 minutes.

25. The process of claim 1, wherein said RNA is contacted with said triethylamine-hydrogen fluoride at about 50 °C to about 70 °C.

26. The process of claim 18, wherein said RNA is contacted with said triethylamine-hydrogen fluoride at about 50 °C to about 70 °C.

27. The process of claim 1, wherein said polar organic reagent is DMSO.
28. The process of claim 18, wherein said polar organic reagent is DMSO.